Adaptive Tabulation for Verified Equations of State JOHN H. CAR-
PENTER, Sandia National Laboratories* — For over forty years, large hydrody-
namic calculations have used tabulated equation of state (EOS) models to reduce
the computation cost associated with complex EOS models. Ideally, these tables
would be verified, in that values interpolated from them match the direct EOS
model calculations within some level of accuracy. For typical rectangular-gridded
tables, and associated interpolation schemes, the verification error is often found
to be quite large. Outstanding issues include grid coarseness and difficulty in re-
producing phase boundary topology. Decreasing the grid spacing quickly becomes
inefficient, due to increasing storage requirements. Instead, a tabulation approach
is demonstrated that naturally incorporates the phase boundary topology through
a triangulated interpolation domain. A given verification level as well as thermody-
namic consistency and stability are ensured through an adaptive refinement process.
Improvements are demonstrated on a simple multi-phase EOS model.

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